

A
T R E A T I S E
O N T H E
Management of B E E S;

Wherein is considered the
Natural History of those Insects:

W I T H
The MANNER of keeping them in HIVES
as well as in BOXES.

W I T H
D I R E C T I O N S
F O R T H E I R
C O N S T R U C T I O N.

Assisted with EXACT DRAWINGS of each,
ENGRAVED ON COPPER.

By T H O M A S W I L D M A N.

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TREATISE

ON THE

Management of BEES

Which is intended to

illustrate the history of those insects

and the manner of keeping them in hives

as practised in France

By

PIERRE CROZIER

TOURNAI

CONSTANTINOPLE





To the R. B. D. E. R.

MR. WILDMAN, whose knowledge in the management of Bees, exceeds any thing yet known amongst us, of which he has given the most public proofs; has lately published in quarto "a Treatise on the management of Bees, wherein is contained the natural History of those Insects, with the various Methods of cultivating them, both antient and modern, and *the improved treatment of them*; to which are added the natural history of Wasps and Hornets, and the means of destroying them. Illustrated with copper plates." What is chiefly to be met with in the following sheets, is that part of his undertaking, which contains *the improved treatment of Bees*, in which he has been most attentively followed, and in the order he has set out, particularly attending to what he gives as the method he himself has pursued, whether of his own invention, or taken from other writers on the subject, and reduced into practice by him; no less care has been taken to make such an extract of his natural history, as will entertain and convey some knowledge; and for the greater illustration of this, we have given such engravings as he thought necessary; those particularly that serve to illustrate and facilitate the construction of his Boxes and Hives, are executed with equal care. It is to be presumed, such attention and helps have been given in this performance, as will really render it useful, comprehensive and per-

fect ; no part having been omitted that could be brought into practice (laying aside speculation) confining ourselves to the subject of, *the improved treatment of keeping bees, whether in boxes or hives*, his treatment of them in Winter as well in the working season, pursuing him with an exactness that must be commendable, when pointed out by so able a master, not presuming to make any alteration.

His natural history of Bees in this piece is abridged, as well as the various methods of cultivating them, both *antient* and *modern* ; his natural history of Wasps and Hornets is entirely omitted, as not coming within the design of this performance, except his manner of destroying those devourers of our choicest fruits, and great enemies to the species of Insects, we have so very particularly taken into our care. His method of rendering the Bees so subservient to his will, is given in his own words, but from it we have not the advantage we could wish, tho' perhaps all the knowledge we could expect, as experience and practice are the masters here, and which can only be copied by an equal application with him, who formed the original ; however, tho' perhaps we may not chuse to shew our swarms pendent at our chins, yet we may be so far instructed by his account of his art, as to manage them, with more certainty and advantage in their proper homes.

The power and influence he has obtained over these Insects, is not less extraordinary than useful, as it contributes very much to their preservation, enabling the practitioner to remove with ease the superabundant Honey, without injury to the giver of it ; this act of humanity is supported by his
dis-

discovery of the influence of fear on them, and the art of using it to their preservation, whether in uniting swarms, strengthening weak Hives, or adding reserved Combs to their stock in seasons of scarcity, or the reverse in those of plenty; thus powerfully has he employed the passion just mentioned, which has enabled him to do every kind of office; for the preservation of their monarchical state, in separating the queens, when two come forth, and the employment he has lately made of them, to the high entertainment and surprise of the beholder.

Madam *Vicat*, so much celebrated in the memoirs of the society of *Berne*, has pursued a method both ingenious and easy, in the management of her Bees, so practical, and so much in our scheme, that we have given her process, which may be applied, almost to every circumstance of our intercourse with them, founded on their ability of readily recovering from a seeming drowned state.

...of them to his high commandment, and
...and the commandment he has lately
...in separating the people, when two
...for the preservation of their lives,
...which has enabled him to do every kind
...has he enjoyed the p. of his situation
...for the reward is both of plenty; thus
...to his riches in the nations of
...and a crown of glory, in addition
...of his riches of him of them, and

of text, recovering from a recent crowd
and interest, with them, found on the wall
the English, almost in every circumstance of
life, that we have seen her people, which
of course, is peculiar and in most in our
the both agencies and early in the management
of the policy of the state, has passed a me-
morable time, is much celebrated in the an-



T H E
C O N T E N T S.

CHAP. I. **A**N account of the nature and formation of bees: with the manner of building their combs, and constructing their cells, as well for the working bee, the drone, and the royal female, called the queen. Extracted from the memoirs of the royal Academy of Sciences, 1.

CHAP. II. Of swarming and the different signs to be observed previous to the bees coming forth, the time of the day when they may with more certainty be expected, the different methods of hiving them: How hives are to be prepared for the reception of the bees, Directions for the management of late and second swarms and the separating of queens when two come forth. Different methods of extracting the venom of bees and wasps, necessary to be provided with in case of accidents, 16.

CHAP. III. The manner of removing hives for the advantage of pasture as practised in France, with the management of them in such expeditions. Directions for weighing hives, as recommended by the Dublin Society, necessary upon many occasions to judge of the circumstances of them, 32.

CHAP.

C O N T E N T S.

CHAP. IV. Of the management of bees in hives and boxes, with directions for adding or removing of hives, according to the circumstances of the bees; and the treatment of them in the season for working as well as that in autumn, when they are to be prepared for their preservation in the winter. Directions for hiving bees in boxes, with the manner of removing honey from them without injuring the bees. Directions for separating of hives and boxes, when the comb descends from the box or hive in which it is began, to the one under it, 38.

CHAP. V. The different methods for taking wax and honey from hives, without destroying the bees. The author's manner of leading bees to different places, and his attaching them to himself. The different methods of fumigating them, for the purpose of removing them from one hive to another. The use made of water by Madam Vicat, for the different operations necessary, relative to bees, 49.

CHAP. VI. The manner of separating the honey and wax, with the process necessary to be pursued, with the method of washing and boiling the latter, and how it may be used by the makers of mead, for the easy extracting of the honey. Directions for having the wax pure, refining such as is in another state, the degree of softness it should be kept, for the wax chandler, and what is particularly to be observed in the melting, 59.

CHAP. VII. Instructions for the care of bees during the winter and the approach of spring, the

C O N T E N T S.

the method of supplying the bees with honey in seasons of scarcity. Their winter station. The danger of placing them on stone stands. Observations on the state of bees in cold weather, and their preservation accounted for. Treatment of the bees in spring, 68.

CHAP. VIII. Directions for making mead, with what is particularly to be attended to in the boiling and the fermentation of it, 69.

CHAP. IX. Directions for destroying of wasps and hornets, whether in the garden or in their habitations, 71.

Observations on the value of Spanish broom, for feeding bees, 74.

An approved recipe for making Mead, 76.

Directions for rearing Turkeys, 77.

Directions, for preserving the seedling leaves of turnips and cabbages, 78.

C O N T E N T S

A method of keeping the bees in winter in
regions of country where the winter is severe. The
method of placing them in some place. One
method on the side of the hill in cold weather
and their preservation accounted for. Their
method of the bees in spring. &c.

Part VIII. Directions for making honey, with
part in particular to be attended to in the
keeping and the management of the bees.

Part IX. Directions for destroying of wasps
and hornets, whether in the garden or in their
habitations. &c.

Directions on the value of Spanish bees, for
keeping bees, &c.

Approved recipe for making Malt, &c.

Directions for treating Fleas, &c.

Directions for preserving and sucking leaves of
cabbages and capsaes. &c.

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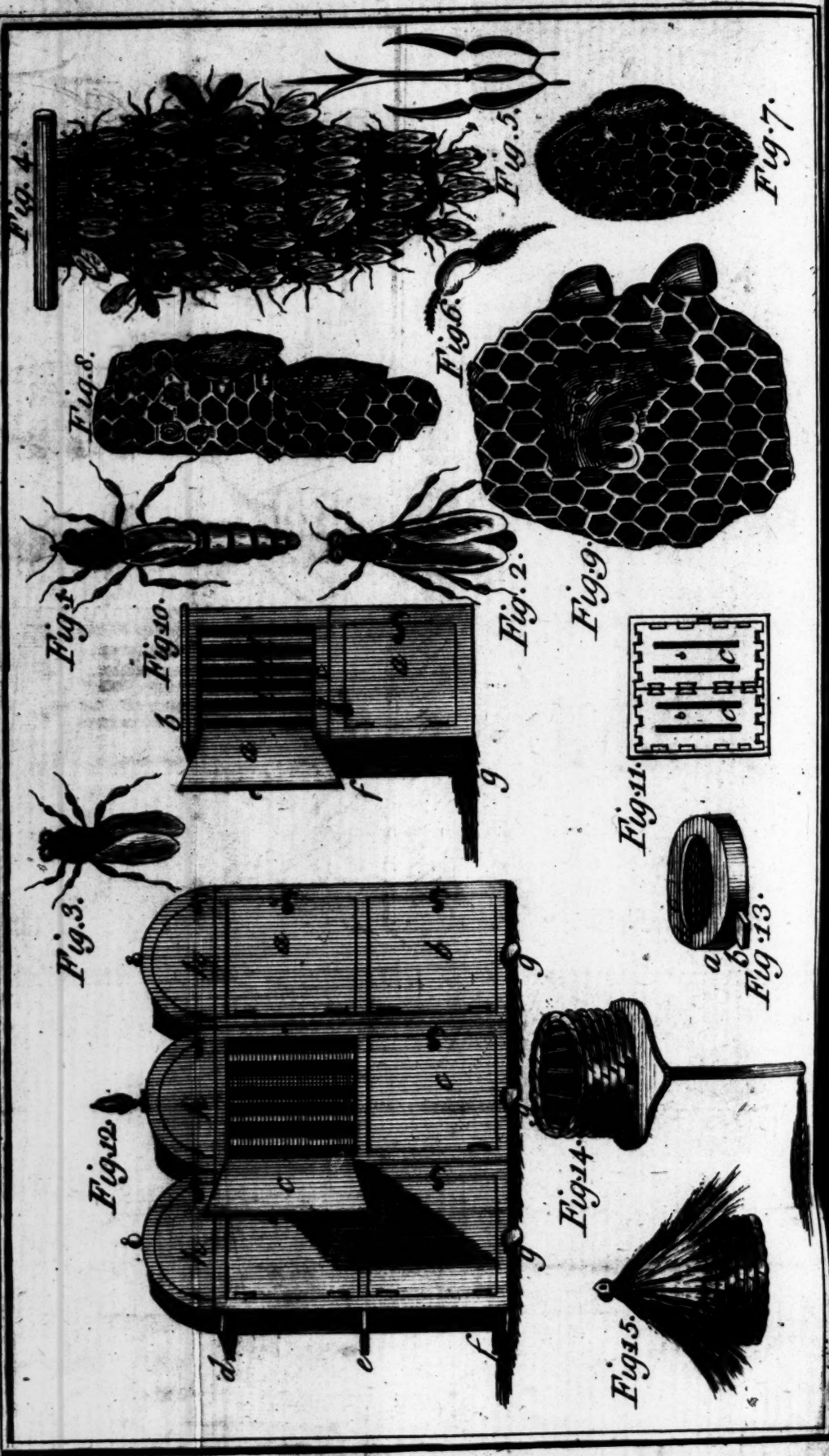
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cabbages and capsaes. &c.

New Invented Bee Boxes.





TREASURY

ON THE

Management of BEE S.

CHAP. I.

An Account of the Nature and Formation of Bees: with the Manner of Building their Combs, and Constructing their Cells, as well for the working Bee, the Drone, and the Royal Female, called the Queen. Extracted from the Memoirs of the Royal Academy of Sciences.

THOSE who have been curious in their description of bees, have observed, that the insect is divided by two ligaments into three parts or portions, the head, the breast, and the belly. The head is armed with two jaws and a proboscis or trunk; the former of which play like two jaws opening and shutting towards the right and left.

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The trunk is composed of five branches, two of which are detached from the others quite from their root, the one to the right, the other to the left; the three others do not separate till about the middle of the trunk. The middle branch is cylindrical, about the size of a human hair, and when seen with a microscope appears through the whole length to be divided by several rings. This part, which may be properly called the trunk, is one of the principal organs of bees, with which they collect the honey from the flowers.

The other four branches are larger towards their origin, and go tapering on to the very point. They are made in the form of a gutter, being concave on the side towards the trunk, and convex on the other; they are of the consistence of horn; the two branches detached the nearest from the root are the largest, and inclose the other two. They unite so well together, that, when closed, they seem to form only a single tube.

We have given a view of the proboscis of the bee on the plate, fig. 5.

The middle part or breast of the bee is of an oblong spheroidal figure, on the upper part of which are fastened two wings, one on the right, the other on the left. Each of these wings is accompanied by another, which is as it were adherent



rent to it, but smaller than the other: it is with these four wings that the bees make those sounds or hummings, in order to give notice to one another.

On the under side of this part of the body are six legs, three on the right side, and three on the left. Two of these legs are on the fore-part, and very near the head; they are the least of the six; four others are nearer the belly, and almost close to one another; the two middlemost are longer than the first, and shorter than the hindmost. All these legs are distinguished by several joints, of which there are three much larger than the rest. The middlemost joint of the two hinder legs, is much bigger than the others, and there is on the external side a little hollow, or cavity, in the shape of a marrow spoon, surrounded with a great number of small hairs; it is in this hollow that the bees collect, by little and little, the particles of wax from the flowers.

We have given a view of one of the hind legs of a working bee, loaded with wax on the plate, fig. 6.

The belly is the last division of the bee; it is distinguished by six rings. In the inside are two parts very remarkable, the one is a small bladder or reservoir, in which the honey which the bees sip from the cups of flowers are collected, after it has passed through the proboscis, and also through

a very narrow tube that traverses the head and breast of the bee. This bladder when full, is of the size of a small pea, and so transparent that the colour of the honey may be seen through it.

The other remarkable part is the sting, which is situated at the extremity of the belly of the bee; it is drawn in and darted out with surprising quickness, by means of muscles placed near the sting. It is about two lines in length, and of the consistence of horn. It is hollow within in the manner of a tube, through which the venomous liquor included in a bladder near the root of the sting, is injected into the wound, the very instant the bee pierces the skin.

Any person who carefully examines a hive at different seasons of the year, will easily distinguish three sorts of bees, of which the far greater number are the working bees, who perform all the business of the hive, and seem to be neither male nor female. This bee is represented by fig. 3, in the plate.

The second sort, called the drones, are the males, and somewhat larger than the former; they have no sting, nor ever stir from the hive, but live upon the honey prepared by the others. This bee is represented on the plate, fig. 2.

The third sort is a much larger and longer bee, of which there are few, generally only one, in every swarm of young bees, who are from time to time detached from the hive in search of another habitation. This large bee is what the antients called the king, from the respect they always saw paid to it by the other bees; but being the female, the moderns more properly give it the title of queen, or mother of the swarm. This bee is represented at fig. 1.

When these industrious insects begin their works, it is observed they divide themselves into four parties, one of which is destined to the fields to provide materials for the structure; the second works upon those materials, and forms them into a rough sketch of the dimensions and partitions of the cells; the third examines and adjusts the angles, removes the superfluous wax, polishes the work, and gives it its necessary perfection; and the fourth is employed in bringing provisions to the labourers that build them, because polishing is not so laborious. They begin their work at the top of the hive, continuing downwards to the bottom, and from one side to another: and to make it the more solid they use a sort of tempered wax, resembling glue. The form of the cells of the honey comb is hexagonal, which figure, besides what is common with a square and equilateral triangle, has the advantage of including a greater space within the same surface.

The expedition of the bees in their labour, is almost incredible; for notwithstanding the elegance and just proportions of the work, they are so indefatigable, that they will, in one day, finish a honey-comb a foot long, and six inches broad, capable of receiving three thousand bees.

It is not easy to know, particularly, the manner in which they employ themselves at this work, on account of the number of bees then in motion, by which means the eye can hardly distinguish any thing but confusion. We have however been able to observe the following particulars: some bees, bearing in each of their talons a little piece of wax, are seen running to the places where their companions are at work upon the combs; at their arrival they fasten the wax to the work by means of the same talons, which they apply sometimes to the right, and sometimes to the left. Each bee is employed but a short time on this work, when another takes its place.

While a part of the bees are at work in constructing the cells, others are employed in perfecting those that are newly modelled, finishing the angles, sides, and bases, in so exquisite a manner, and with such remarkable delicacy, that three or four of these sides laid upon one another, are not thicker than a leaf of common paper; and because the entrance of the cell, which is adapted to the size of the bee, would, on account of this delicacy,

cacy, be subject to break, they strengthen the entrance of each cell with a border of wax. We have already observed, that the bees which build the cells work but a little at a time; but it is different with regard to those that polish them, for they work for a long while, and with great expedition, never intermitting their labour, unless it be to carry out of the cell the particles of wax taken off in polishing; and, to prevent this wax from being lost, other bees stand ready to receive it from the polishers, and carry it to some other part, in order to its being employed.

Each comb has two rows of-cells opposite to each other, which have their common bases. The thickness of each comb is something less than an inch; and, consequently, the depth of each cell about five lines; but at the same time the breadth of each is little more than two.

Fig. 7, represents a comb in which the working bees are bred. Two of those cells have young bees inclosed; and a royal cell suspended on one side.

The greater number of combs have cells of this kind; but there are a few others in some particular parts of the hive, which are larger, and appropriated to the lodging of eggs, which afterwards become drones, or male bees. Fig. 8, represents a comb of this kind, the cells of which are larger than those of the former: in several of them

young drones are included ; and two royal cells are suspended on the side.

Besides these different cells, there are, in some parts of the hive, larger than other, and constructed in a different manner. They are of a spheroidal figure, open in the interior part, and appropriated to eggs, which afterwards become queens.

Fig. 9. represents a comb in which a royal cell is fixed in the centre ; and several cells of the common sort are sacrificed to serve as a basis, or support, to it. But, in general, the royal cells are suspended on the sides of the comb, as represented in fig. 7, and 8. To the side of fig. 9, two royal cells are represented as begun ; when they nearly resemble the cup of an acorn. The other cells have the young queens included in them.

When the cells are completed, the queen takes possession of those she likes best to deposite her eggs in, and the rest are left to be filled with honey. She lays one egg in each cell, and sometimes more than an hundred of those eggs in a day ; but what is still more remarkable, she lays those eggs which are to produce common bees in cells of the common shape and size, those that are to become drones or males, in the cells of a larger size, and deposites those which are to become females,

females, like herself, in the spheroidical cells already described.

These eggs, after lying some time in the cells, are hatched into maggots, and fed with honey ten or twelve days, after which the other bees close up the cells with a thin piece of wax; and under this covering they become gradually transformed into bees, in the manner as silk-worms are into butterflies. Having undergone this change, the young bees pierce through their waxen doors, wipe off their humidity from their little wings, take their flight into the fields, rob the flowers of their sweets, and are perfectly acquainted with every necessary circumstance of their future conduct. As to the males or drones, which are destined only to propagate their species, they live very comfortably for about three months after they are hatched; but when that time is over, and the females are impregnated, the common bees either kill them, or drive them from the hive, as burthensome to the community, and not a drone is to be found till the next season.

With regard to the hives in which the bees form their curious works, they are either of straw, wood, or glafs.

Straw hives, as far as regards the bees, are preferable to any other habitations, as the straw is not so liable to be heated by the rays of the sun at noon, to which they are generally exposed; and,

at the same time, is a better security against the cold than either wood, glass, or any other material. Their cheapness too is of the utmost consequence, as it renders them an easy purchase to the cottager, and, consequently, puts it in the power of every master of a family to become the proprietor of bees. Their situation should face the south and west, in a place neither too hot, nor too much exposed to cold: in the spring I would advise their situation to face the west, where they may enjoy the afternoon sun, as the bees will not then be tempted abroad. But the present form of beehives is very erroneous; they should be seven inches in height, and ten in diameter: the sides upright, the top and bottom being of the same diameter. In the upper row of straw should be a hoop of about half an inch in breadth, to which should be nailed five bars of deal, a full quarter of an inch in thickness, and an inch and a quarter wide, and half an inch asunder from one another; a narrow short bar should be nailed at each side, half an inch distant from the bars next to them, in order to fill up the remaining part of the circle; so that there will be in all seven bars of deal, to which the bees will fix their combs. The space of half an inch between the bars allow a sufficient and easy passage for the bees from one hive to another. In order to give a greater steadiness to the combs, so that they may not fall out, or incline from their direction, upon moving the hive, a stick should be run through the middle of the hive, in a position directly across the bars,

or

or at right-angles with them. When the hives are made, a piece of wood should be worked into the lower row of straw, long enough to allow a door for the bees of four inches in length, and half an inch in height.

The proprietor of bees should also provide himself with several flat covers of straw, worked of the same thickness as the hives, and a foot in diameter, so that it may be of the same width as the outides of the hives. Before the cover is applied to the hives, a piece of clean paper, of the size of the top of the hive, should be laid over it, and a coat of cow-dung, which is the least apt to crack of any cement, and easily obtained, should be laid all round the circumference of the hive on the paper, when the cover may be laid upon this, and sewed to the hive by means of a packing-needle and thread. This will prevent either cold or vermin from entering the hive.

Each hive should stand single upon a piece of deal, (it is the best, as it absorbs the moisture sooner than a harder wood) somewhat larger than the bottom of the hive: part of the stand which is at the mouth of the hive, should project some inches for the bees to alight on when they return from the field, with an inclination to carry off the rain water. This stand should be supported by a single post two feet and a half high; to which it should be fastened very securely, as well as the post in the ground; that high winds, or other accidents,

cidents, may not overfet them. A quantity of foot mixed with barley-chaff should be ftrewed on the ground round the poft, which will effectually prevent ants, flugs, or other vermin, from vifiting the hive, which fhould be renewed as it is blown or washed away: efpecially care fhould be taken that not any weeds are fuffered to grow near the hive, as they will afford fhelter to vermin, which may be hurtful to the bees.

We have given views of the ftraw-hive defcribed above on the plate annexed, fig. 14. The fig. 15 represents the hive covered with a hood of ftraw to defend it from the rain, and the other fig. 14, placed upon its ftand, with the top open, in order to fhew how the bars of deal fhould be fixed in the upper part of the hive.

But though ftraw-hives are preferable to boxes in real utility, yet many prefer the latter, as more ornamental, and, at the fame time, affording, by means of windows, a very agreeable entertainment to the eye, by viewing the daily progress made in the works by thefe laborious infects. With this view glafs-hives have alfo been made ufe of; but it has been found, that they give fo little real information, and, at the fame time, are fo difagreeable to bees, that they are now generally laid afide.

In constructing bee-boxes, regard fhould be had both to ornament, and facility of taking the honey

ney and wax; and both these intentions the following boxes will fully answer. The small boxes, fig. 10, will be found superior to any yet made known; and will also be at least equal to them in the entertainment they will afford by means of their windows. The larger box, fig. 12, will answer all the purposes of glass-hives; for not only the labouring bees, but the queen also, may be seen whenever the owner pleases.

The double square box, fig. 10, made to part into two, is eighteen inches and a half high, and ten inches square. It consists of a frame with doors, *a, a*, on three of the sides, the fore-part having a fixed cover. The upper box has a cover *b*, moving on hinges, and secured in the fore-part with a lock. The sliding frames *c, c*, fig. 11, in which the bees make their combs, are three inches and a quarter thick, eight inches wide, and eight and a half long. Each of these frames have four slides, *d, d*, fig. 10, one inch wide, and half an inch asunder; intended to prevent the bees from extending their combs to the glass, which would render the taking them out inconvenient. There is an upright partition *c*, in the middle, to strengthen the frame, through the middle of which there is a slit or division half an inch wide, to afford an easy passage to the bees: and two similar openings in the bottom, through which the bees may freely pass from one box to another; for this box stands upon another, which, instead
of

14. *Of the Management of Bees.*

of sliders, has six bars, to which the bees fix their combs in the lower box. The two boxes are fastened together by means of a hasp, as represented in the figure. The lower box has, like the upper, three doors, and in each of the doors a pane of glass, fastened in with small brads, which are easily drawn out, when there is occasion to remove the panes of glass. Between the upper and lower boxes is a slider *f*, which is thrust in, when the frames with the combs are taken out of the upper boxes, or when the upper box is changed. The bottom has also a similar slider *g*.

The box, fig. 12, properly consists of three boxes, moving upon hinges, and when brought together is secured by hooks and eyes. When united they are twenty-two inches in height, eighteen in thickness, and twelve in width; forming the appearance of one of the divisions, fig. 12. These boxes are divided into two separate apartments for bees *a*, *b*. In the upper apartment there is a frame constructed in the same manner, and for the same purposes, in the box already described. In each apartment there are two glasses covered with doors *c*, *c*, to keep out the glare of light. Each of these boxes has a cover *d*, sliding in a groove, which is drawn out, when the frame, with the combs, is taken away. These boxes, like the former, have a slider *e*, which moves in a groove between the upper and lower apartments; and also a similar slider *f*, at the bottom, in order

to clear the hive of any dead bees, or other filth that may annoy them. Each box has an opening, or passage, *g, g, g*, half an inch in height, and four inches in length, at the bottom, and also through the division which separates the boxes, in order to give the bees an easy passage to and from the fields, for carrying on their labours. Before every door, whether in a separate or collected state, a semicircular landing board should be placed, by means of two pieces of wire fixed in each, corresponding to holes bored in the boxes, for fastening them in their places. The tops of the boxes *b, b, b*, may be formed in any manner agreeable to the owner.

These boxes, and all the parts of them, should be made of red cedar, the fragrance of which is very agreeable to the bees, and, at the same time, is the warmest, and driest of any wood.

Fig. 13, *a*, is a vessel for feeding bees. It should be nine inches in diameter, and two and a half deep, and turned out of solid wood, for honey is of so penetrating a nature, that no joined vessel will contain it. On one side a piece is cut out to admit a vessel *b*, four inches in breadth, half an inch in height, and projecting one inch beyond the turned vessel; which is to be inserted into the hole by which the bees pass into the hive. The cover should be turned out of the same wood, and secured by a rabbet *c*, which enters a groove in the lid. In the middle cover is a hole covered with

16 *On the Management of Bees.*

with a pane of glass, and lid fitted to it. By which means you may see how the honey is eaten, and replenish it when necessary.

C H A P. II.

Of swarming.

IT has been already observed, that the queen begins to lay her eggs as soon as the severity of the winter's frost is past, and proceeds in proportion to the mildness of the season. The number of young bees that may by this means rise in the hive may endanger the lives of all the bees by famine; an accident not sufficiently attended to; and yet when pointed out appears self-evident: for if the weather comes in mild in January, or even so late as February, so that the queen is induced to lay many eggs, these in due time become bees; and the increased multitude consume a great deal of honey. If this mild weather is succeeded by cold, rainy, or even dry weather, a famine may ensue in the hive, when the badness of the weather prevents the possibility of supply: for during even the cold dry weather, what flowers come forth or open, are found to have none of that sweet juice in them which constitutes honey. Dry days tempt bees to go out, when the cold and fatigue destroy many. On this account the proprietor should examine frequently into the state of his hives at this season, that, if necessary, he may give them a proper supply, in which he should rather be bountiful than otherwise, for they
are

are faithful stewards, and will return with interest what in times of want is bestowed on them. The manner of feeding them will be directed hereafter. It is from this cause that many hives die so late as May: at which the owner is surprized, having observed them in a thriving state some time before, little suspecting that their encrease, which he a little while before was pleased to see, added to his own neglect, was the occasion of this loss. The weight of the hive, at this season, is not to direct your judgment in regard to its wealth in honey and wax, as a great part is owing to the additional weight of the encreased state of the maggots and the young bees, who, if but properly attended at their coming into life, will soon repay your trouble.

When a hive is become too much crouded by the addition of the young brood, a part of the bees think of finding themselves a more commodious habitation; and with this view single-out a queen with whom they take wing. This is called swarming, and happens earlier or later, as the season has been more or less kindly. If the spring is mild, calm, and an early bloom is come on, then the swarms will be early and strong: but if it proves cold and windy with either rainy or dry weather, then there will be but few swarms, and those also very backward.

When the bees are thus crowded, and the weather is warm and calm, they delight to rise, especially after a sudden shower, or when a dark cloud has

has sent them home in crouds. They seldom swarm before the sun has warmed the air, that is, not before ten in the morning, and seldom later than three in the afternoon. We may know that their swarming approaches, if the hive appears so full of bees, that part of them hang in clusters on the outside; and the drones are perceived in greater numbers than usual, especially in the afternoon. But the most certain sign, and which indicates the event to be on that day, is, that the bees refrain from flying into the fields, though the season seems inviting. Just before they take their flight, there is an uncommon silence in the hive, and this continues for some time, or as long as the bees which are going out take up in filling their stomachs with honey, to be a store in case of bad weather; but as soon as one breaks forth, they all follow, and are instantly on the wing.

For three or four nights before a swarm sallies forth, there is in the hive a peculiar humming noise, of which authors give very different descriptions, probably owing to the strength of imagination in each. Every sound among bees arises from their striking their wings against the air: their wings being their sole organ of voice, if I may be allowed the expression. By moving their wings more or less forcibly and swiftly, they beat the air, and form the varied and confused sounds which we call humming. The noise which fore-

tells

tells their swarming is easily distinguished by those who are accustomed to it, and is more especially observed before the casts, or second and following swarms. The reason that this noise is less frequent before the swarm is, that the young queen is not yet in a condition to go out with the new swarm; and therefore the seeming contest between the queens is not heard; in this case the old queen leads forth the swarm. They sometimes swarm, if much crouded, even before the young queen is come out of her cell; for the bees go on chearfully in their labours, while they have the expectation of her coming forth. If their swarming is delayed for some days by rain, and the young queen is become strong enough to take wing, the swarm generally chuse the young queen for their leader; and with this view, she lies in the bottom of the hive, ready to fly off with them. The noise that is heard before the second and following swarms is owing to there being now two queens ready to sally forth, and a contest seems to arise which of them shall go. The old queen is seated in the crown of the hive, and the other near the bottom, and make reciprocal answers to one another. The distance whence the sound comes, probably constitutes the difference observed in the sounds, the one being compared to a base, and the other to a treble; or as expressed by Worlidge, chap. ix. § 3. "The signs
" of after-swarms are more certain; when the
" prime swarm is gone, about the eighth or tenth
" evening

“ evening after, when another brood is ready,
 “ and again hath over-filled the hive, the next
 “ queen beginneth to tune in her treble voice, a
 “ mournful and begging note; then in a day or
 “ two shall you hear the old queen in her base
 “ note reply, and as it were consent. In the
 “ morning before they swarm, they come down
 “ near the stool, and there they call somewhat
 “ louder. At the very time of swarming they
 “ descend to the stool, where answering one ano-
 “ ther in more earnest manner, with thicker and
 “ shriller notes, the multitude come forth in
 “ great haste,” &c. If rainy weather prevents
 their swarming a second or third time beyond
 the fourteenth day, one of the queens, generally
 the young one, is slain on the morning of the
 fifteenth; so impatient are they of the long con-
 tinuance of divided empire: and so sensible is she
 of her own danger, that she sometimes tempts a
 few to accompany her in her flight, be the wea-
 ther ever so little inviting.

The time of the year in which they most ge-
 nerally swarm, is from the middle of May to the
 end of June; but sometimes sooner or later, ac-
 cording as the season is more or less favourable.
 The earliest swarms do not always prove the best,
 especially if they are so early as the end of April
 or beginning of May, for the weather often is
 afterwards so wet and cold, that they are fre-
 quently in danger of being destroyed, or greatly
 reduced,

reduced, by famine. Though swarms which issue forth so late as July are not in danger of a present famine; yet they scarcely have time and opportunity to lay in a sufficient store for the winter. Towards the season of swarming, the door of the hive should be enlarged, to give the bees the greater freedom to issue out; and it should likewise remain so for young swarms, during the first fortnight or three weeks, to allow the freer entrance to the bees at that time extremely busy in collecting their necessary stores. The entrance should afterwards be gradually lessened, to prevent the otherwise easy access of enemies, of which there is great danger, especially as the autumn advances.

Whenever the bees of a swarm fly too high, they are made to descend lower, and disposed to settle, by throwing among them handfuls of sand or dust; probably the bees mistake this for rain. It is usual at the same time to beat on a kettle or frying-pan; perhaps from its being observed that the noise of thunder prompts such bees as are in the fields to return home. Precautions of this kind are the more necessary, if, as Dr. Warder observes *, “ the bees always provide a place for “ their habitation before they swarm; either in “ some hollow tree, or in the hollow part of

* The true Amazons, or the Monarchy of Bees; 8th edit. p. 77.

“ some

“ some old building, or in some deserted hive,
 “ which the swarm have already prepared, by
 “ cleaning out whatever may be offensive to their
 “ cleanly nature.” Of this he gives an instance;
 and concludes, that “ though they provide them-
 “ selves a house before they swarm, and take
 “ much pains about it; yet if you are early in
 “ taking the swarm, and they find themselves
 “ placed in a convenient house, they but sel-
 “ dom shew an inclination to leave it: but should
 “ they rise again the same day, or the following,
 “ be assured there is something displeasing to
 “ them in the hive.

When the bees first settle in swarming, indeed when they at any time rest themselves, there is something very peculiar in their method of taking their repose. It is done, by collecting themselves in a heap, and hanging to each other by their feet. They sometimes extend these heaps to a considerable length. It would seem probable to us, that the bees from which the others hang must have a considerable weight suspended to them. All that can be said is, that the bees must find this to be a situation agreeable to themselves. They may perhaps have a method of distending themselves with air, thereby to lessen their specific gravity; in the same manner as fishes do, in order to alter their gravity compared with water. A representation of this appearance may be seen on the plate, fig. 4.

When

When a swarm divides into two or more bands, which settle separately: this division may proceed from there being two queens, though they sometimes settle separately, when there is but one queen among them. In this case, one of the clusters is larger than the other; and the bees of the smaller cluster will detach themselves by little and little, till at last the whole unite with the larger cluster, in which the queen is. If there are two queens, and the swarm is early and large, each cluster may be hived separately: or if the clusters unite, one of the queens must be sacrificed to the peace and tranquillity of the hive. If this execution is left to the bees, it generally raises a considerable commotion in the hive, and is done in the evening of the first day; for if it is delayed till morning, the youngest of the queens will, if possible, take flight, and return to the mother hive. In order to prevent this commotion, it will in this case be adviseable to seize one of the queens alive, and keep her prisoner with about a hundred or more of her subjects, in a box with small holes in it sufficient to admit air, but not so large as to permit the bees to escape. In this box a comb with honey should be given them for sustenance, in case they are kept for some days, that you may have her in reserve, lest a queen should be wanted for another swarm. For this purpose, towards the evening, spread a cloth on a table, and strike the bees down upon it, seize the first queen you spy, as prisoner, while you satisfy

satisfy yourself that there is another. She will sometimes elude your sight; but if the bees remain quiet, you may presume there is another, and put the hive over them again, into which they will soon ascend. If you find them quiet, then all is well. But if, instead of working in the morning, the bees fly about irregularly, the queen must be restored to them, for unless a queen is given to them, they will all return to the mother-swarm, which they never do while their queen continues with them, though the young swarm is placed ever so near it. Should their queen die, even several weeks after their swarming, they will return to their mother hive, carrying their honey along with them.

When the swarm takes wing, the young queen may fall on the ground, not being able to fly, through some defect in her wings. The poor disabled queen may be picked up on the grass, and put on the edge of a hive, or hat or any other thing on which she may become conspicuous to the swarm; they will immediately collect round her, when a hive may be easily put over them. When fallen, she is never found, without some attendants, whom nothing but violence can separate from her. In case the queen is not raised from the ground, the bees will return to their first abode; as they are sometimes found to do after they have lighted on a tree, probably owing to the young queen's not coming forth with them,
for

for want of strength, or perhaps courage to trust to her wings for the first attempt.

As soon as the swarm is settled, the bees which compose it should be put into one of my hives, fitted with a cover, with all convenient speed, to prevent their taking wing again. If they settle on a small branch of a tree, and easy to be come at, it may be cut off, and laid upon a cloth; the hive being ready to be put immediately over them; but if the branch cannot be conveniently cut, the bees may be shook from it into a hive, in which, if you are so fortunate as to get the queen, the rest will soon follow. If the bees must be greatly disturbed in order to get them into a hive; the most adviseable way is to let them remain in the place where they have first settled, till the evening, when there is less danger of their taking wing. If it is observed that they still hover about the place they first alighted upon, the branches there may be rubbed with rue, stinging nettles, or elder leaves, or any other thing distasteful to them, to prevent their returning to it.

The hive should be cleaned with the utmost care, and its inside rubbed very hard with a coarse cloth, to get off the loose straws, or other impurities, which might cost them a great deal of time and labour to gnaw away.

The hive should not be immediately set on the stool where it is to remain, but should be kept

26 *On the Management of Bees.*

near the place at which the bees settled, till the evening, lest some stragglers should be lost. It should be shaded, either with boughs, or with a cloth, that the too great heat of the sun may not annoy the bees.

Scarce has the swarm arrived at its new habitation, when the working bees labour with the utmost diligence, to procure materials for food and building. Their principal aim is not only to have cells in which they may deposit their honey, but a stronger motive animates them; they seem to know that their queen is in haste to lay her eggs. Their industry is such, that in twenty-four hours they will have made combs twenty inches long, and wide in proportion. They make more wax during the first fortnight, if the season is favourable, than they do during all the rest of the year. Other bees are at the same time busy in stopping all the holes and crevices they find in their new hive, in order to guard against the entrance of insects which covet their honey, their wax, or themselves; and also to exclude the cold air; for it is indispensably necessary that they are lodged warm.

A second swarm scarcely is, and much less the subsequent ones, worth keeping single; for, being few in number, they cannot allow so large a proportion of working bees to go abroad in search of store, as more numerous swarms can, after having appointed a proper number for the various

various works to be done within. For this reason it is adviseable to unite two or more of these last or latter swarms, so as to procure a sufficient number of bees in one hive. Bees sometimes swarm so often, that the mother-hive is too much weakened. In this case the swarms should be brought back; and this should also be done when a swarm, the first summer produces a swarm, as it sometimes does. The best way, indeed, is to prevent such swarming, by giving the bees more room: but this will not always answer where there is a young pregnant queen; she well knowing that her life is the forfeit of her remaining at home.

Though all writers acknowledge that one of the queens is constantly slain on these occasions; and generally a considerable number of the working bees; yet none of them, Columella excepted, Lib. 9. C. 9. have proposed a method for killing the queen of the latter cast or swarm, before the union is made; by which the lives of several working bees will be preserved.

If an old hive is so full of bees, that they rest in the night under the board, and yet shew no disposition to swarm, turn the hive bottom up, and give it some slight strokes on the sides, so as to alarm the bees. They will immediately run to the extremities of their combs. If you look attentively to the middle of the hive, you will

perceive the queen among the foremost. Seize her between the fore-finger and thumb, and confine her in your hand till most part of the bees take wing: let her then go, the bees will soon join her, and settle on some branch of a tree, when they may be put into an empty hive. Setting the old stock in its place, that the bees which have been out in the fields may enter it on their return, and having remained there an hour or so, it is then to be put on another stand near or next its own. The hive having what may now be called a swarm in it, is then placed on the stand with the old stock: and if the bees in both work regularly, carrying loads, all is well. This backwardness to swarm may be owing to their want of a queen to lead them forth; and the old queen is loth to go, till a young one is bred: yet if a royal cell contains a young queen, the bees in both hives will thrive; as those in the old stock will go on in expectation of the young queen's coming forth.

This separation should not in prudence be attempted, unless you have a queen in reserve: for if the bees in the old stock, when placed on their stand, are in an uproar, there is no queen, nor prospect of a queen among them: and in this case their own queen should be restored to them, and the reserved queen be put to the swarm of bees in the empty hive, which should then be carried to the distance of half a mile, and remain there

there for a few days, till they have made some work, when they may be brought back to their former station. Care should be taken that the number of bees separated from the old stock should be sufficient in number to make a swarm. On this account it is perhaps better to use the following method. A sufficient number of bees should be taken from the stock, in the manner that shall hereafter be directed, and put in an empty hive. The eye will judge of the numbers. When one half, or a sufficient number, is got into the empty hive, it should be carried to some distance. The silence in either hive will soon indicate where the queen is. It would be eligible that their own queen remained in the old stock; but if she has not, the reserved queen may be put to them, and they should be immediately restored to their former stand, and the bees that are separated taken to the distance of half a mile as before.

A large swarm may weigh seven pounds, and these are esteemed good that weigh but five or six pounds; such as are under four pounds should be united to a less numerous swarm.

Should several days of rain succeed a swarm's coming off, they may die of famine, if not timely relieved with honey.

As bees are not apt to sting when they swarm ; it is not necessary then to take much precaution against them.

Many people have so strong a dread of bees, that no assurance of safety can prevail upon them to act familiarly with these insects. Indeed there seems to be a hidden quality in some men which renders them disagreeable to bees. In either of these cases, it is adviseable to follow the directions given by Mr. Worlidge, *ubi supra*.

“ I have gone among them in their greatest anger and madness, only with a handful of sweet herbs in my hand, fanning about my face, as it were, to obscure and defend it. Also, if a bee do by accident buz about you, being unprovided, thrust your face amongst a parcel of boughs or herbs, and he will desert you. But the most secure way of all, and beyond the completest harness yet published, is to have a net knit with meshes so small, that a bee cannot pass through, and of fine thread or silk, large enough to come over your hat, and to fall below the collar of your coat, through which you may perfectly see what you do, without any danger; having also on a pair of woollen gloves.”

Oil of olives, or any mild oil, is thought by many to be a cure for the pain and inflammation arising

arising from the sting of a bee; but repeated experiments have shewn that it fails oftener than it succeeds. It seems probable, that the success sometimes met with was rather an accident than a cure; for there are many people to whom the sting of a bee does not occasion any pain or inflammation: some men disdain to use the least precaution even when they are sure of many stings. There are, perhaps, many other remedies which owe their reputation to similar causes. Vinegar is equally unsuccessful; bruised parsley is by many thought to give ease; Mr. *Rocque* of *Walbam-green* says, that being stung even by a wasp, the leaves of burnet, rubbed pretty hard upon the part, immediately took off the inflammation. Honey, which may be got out of the body of the bee which inflicted the wound, is thought a good cure. Indigo, dissolved in water, has been found effectual; as have the juice of the succulent leaves of vegetables, renewed as often as they grow warm: and some recommend, as the most sure remedy, to heat a piece of iron in the fire, or for want of it to take a live coal, and to hold it as near and as long to the place as you can possibly endure it. One very necessary caution is, to pull out the sting from the wound as soon as possible; for the longer it remains in it, the deeper it pierces, owing to its peculiar make.

Mr. Bartlet observes, that the Sting of a Bee or Wasp, is sometimes very trouble-

some, and attended with more pain, swelling, and inflammation in some habits than could be expected from such little enemies; the common cure, in such accidents, is immediately sucking out with the mouth the instilled poison, bathing the part well with warm oil, and applying to the wound a poultice of bread and milk well softened.

Discutient or dispersing ointments or fomentations are in some constitutions necessary, to bathe the part for reducing the swelling: nor should cooling physic and bleeding be omitted.

C H A P. III.

The manner of removing Hives for the Advantage of Pasture as practised in France.

THE author of the Natural History of Bees gives the following account of what is practised in this way in France; an example well worth our imitation in many parts of this kingdom, " M. Proutaut, says he*, keeps a great number of " hives. His situation is one of those in which " flowers become scarce very early in the season, and where few or none are seen after the " corn is ripened. He then sends his bees into " Beauce, or the Gatinois, in case it has rained

* P. 428.

“ in those parts. This is a journey of about
“ twenty miles, which he makes them take.
“ But if he concludes that the bees could not
“ meet, in either of those countries, wherewith
“ to employ themselves advantageously, he then
“ has them carried into Sologne, about the be-
“ ginning of August; as knowing that they will
“ there meet with a great many fields of buck-
“ wheat in flower, which will continue so till
“ about the end of September. His method of
“ transporting them is thus. His first care is,
“ to examine those hives, some of whose honey-
“ combs might be broken or separated by the
“ jolting of the vehicle; they are made fast one
“ to the other, and against the sides of the hive
“ by means of small sticks, which may be dispo-
“ sed differently as occasion will point out. This
“ being done, every hive is set upon a packing-
“ sheet, or something like it, the threads of
“ which are very wide: the sides of this cloth
“ are then turned up, and laid on the outside of
“ each hive, in which state it is to be secured,
“ when they are to be placed in a cart standing
“ by each other; over these are placed others;
“ which make, as it were, a second story or bed
“ of hives, observing to turn those that are
“ stored with combs topsy-turvy. It is for
“ the sake of their combs, and to fix them the
“ better, that they are disposed of in this manner;
“ for such as have but a small quantity of combs
“ in them, are placed in their natural situation.

“ Care is taken in this stowage, not to let one
“ hive stop up another ; it being essentially neces-
“ sary for the bees to have air ; and it is for this
“ reason they are wrapped up in a coarse cloth,
“ the threads of which were wove very wide, in
“ order that the air may have a free passage, and
“ lessen the heat which those insects raise in their
“ hives ; especially when they move about very
“ tumultuously, as often happens in these carts.
“ Those used for this purpose in Yèvre, hold
“ from thirty to forty-eight hives. As soon as
“ all are thus stowed, the caravans set out. If
“ the season is sultry, they travel only in the
“ night ; but a proper advantage is made of cool
“ days. You’ll imagine they don’t ride post.
“ The horses must not be permitted even to
“ trot ; they are led slowly, and through the
“ smoothest roads. When there are not combs
“ in the hives sufficient to support the bees during
“ their journey, the owner takes the earliest op-
“ portunity of resting them wherever they can
“ collect for themselves ; for this purpose the
“ hives are taken out of the cart, and set in a
“ place convenient for the purpose, first disenga-
“ ging them from their covering. In the evening,
“ as soon as they are all returned, the hives are
“ shut up ; and being placed again in the cart,
“ they proceed in their journey. When the ca-
“ ravan is arrived at the journey’s end, the hives
“ are distributed in the gardens ; or in fields ad-
“ jacent to the houses of different peasants, who,
“ for

“ for a very small reward, undertake to look after them. Thus it is that, in such spots as do not abound in flowers at all seasons, means are found to supply the bees with food during the season.”

Before the hives are removed with a view of sending them to better pasture, those that are well stored with honey, if of my construction, should be laid by, lest the weight of the honey should break the combs. If the bees are in a hive of the old make, it should be robbed of its heaviest combs for the same reason. It should be robbed some days before the removal, because the bees will not have time to secure sufficiently the combs with young in them, which might have been loosened in removal.

When under the necessity of transporting them, water carriage is the best; but if by land, I would advise the hives to be taken in the hand, or suspended on a pole on mens shoulders, or after the manner of a litter between horses, or as game cocks are brought from their walks, observing when carried on the flat, they should be raised as to admit air to them: and if by their noise they express any uneasiness from heat, the hives must be turned bottom up, in order to cool them; and if the weather is very hot, the bees may be taken out of the hives every evening, and returned again in the morning before they are put on their stands.

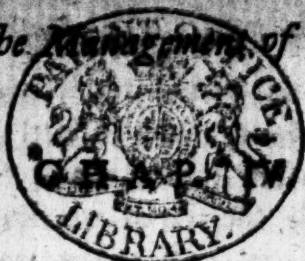
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The hive should be transported in the night, and rested during the day, each hive being rested on a temporary stand during the day, that the bees may go forth in search of food, or that they may at least have it in their power to go out; for a long restraint would be extremely irksome to them.

This practice would certainly make an ample return, if brought into general use, as it might with advantage, from the succession there is in the vegetation of the plants, shrubs, and flowers, in several parts of this kingdom, the heath of our mountain ground, and the blossoms of the blackberry, lengthen out the season of collecting honey until late in August, as does the buck-wheat until September. The bees will themselves go far in search of food; but surely carrying them to the spot where they obtain it, saves much of their time and labour, and becomes a proportionable gain to their owner. The following may be reckoned amongst the plants, &c. that afford food for bees; viz. Spanish broom, mustard, clover, turneps, rosemary, thyme, savory and sweet marjoram; as are trees in general, for from them frequently flows a liquid, which overspreads their leaves, called the honey-dew, and of which they are very fond.

The Dublin Society for the improvement of Agriculture, Planting, &c. and the politer Arts,
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a most respectable body, not less a credit to the kingdom of Ireland, than useful to those countries who imitated them; have for the encouragement of this species of profitable husbandry, appointed premiums as a reward to the most successful and industrious; whose superiority is determined by the quantity of wax and honey collected, which is discoverable in no other way, so well as by weighing the hives, which they have recommended in the manner following. In the evening when all is still, let the hive be steadily raised from the stand, and set on a table near it, over which a cloth has been laid, sufficiently large to admit the corners to be tied on the top of the hive; in this state it may be weighed without any danger. This method is recommended to be put in practice, when hives with swarms are to be moved, and when to a distance, the hive thus covered, may be rested on a board somewhat narrower than the base of the hive, when it may with great safety be taken on a person's head.

*Of the Management of Bees in Hives and Boxes.*

AS a good swarm will fill one of my hives, another should be put under it the next morning; for the larger space allowed the bees, will excite their industry to fill it with combs. The queen will begin to breed in the upper hive; but so soon as the lower hive is filled with combs, she will lay most of them there. In little more than three weeks, all the eggs laid in the upper hive will become bees, and should the season be favourable, their cells will soon be filled with honey.

So soon as they want room, a third hive should be placed under the two former, and in a few days after the end of three weeks from the time the swarm was put into the hive, the top hive may be taken away at noon of a fair day; and if any bees remain in it, carry it to a little distance from the stand, and turning its bottom up, striking it on the sides, the bees will take wing, and join their companions in the second and third hives. If it is found that they are very unwilling to quit it, it is probable that the queen
remains

remains among them. In this case the bees must be treated in the manner that shall be directed, when I give directions for taking the honey and wax without killing them. The upper hive which is now taken away, should be put in a cool place, where no vermin, mice, &c. can come at the combs, as they are to be preserved for use.

As soon as the hives appear to be again crouded, and the upper hive is well stored, or filled with honey, a fourth hive should be placed under the third, and the upper hive taken off the next fair day at noon, and treated as already directed. As the honey made during the summer is the best, and as it is needless to keep many full hives in store, the honey may be taken out of the combs of this second hive for use.

If the season is very favourable, the bees may still fill a third, or perhaps a fourth hive. In this case a fifth hive must be put under the fourth, and the third taken away as before. The bees will then fill the fourth for their winter store. As the honey of the two first hives is better than the honey collected so late as that in the third, it may be reserved for use, and the third preserved with care for the use of the bees, should they want in the winter.

In the month of September, the top hive should be examined, and if full, it will be a sufficient provision for the winter: but if light, that is, not containing twenty pounds of honey; in the month of October, the fifth hive should be taken away, and the third hive kept in reserve should be put upon the remaining one, to supply the bees with abundant provisions for the winter. Nor need the owner grudge them this ample store, for they are faithful stewards, and will be proportionally richer, and more forward in the spring and summer, when he will reap an abundant profit. The fifth hive which was taken away should be carefully preserved during the winter, that it may be restored to the same stock of bees, when an additional hive is wanted next summer: or for the first swarm that comes off. The combs in it, if kept free from filth and vermin, will save them much labour, and by being provided with combs, will have more leisure to collect honey.

It is almost needless to observe, that when the hives are changed, a cover, as already directed for the first, should be put upon every upper hive: and that when a lower hive becomes an upper hive, the door of it should be shut up, that their passage may be only through the lower hive; otherwise the queen would be apt to lay eggs indiscriminately in both. The whole
of

of what has been directed for the management of one hive, may be extended to any number: it will be proper to mark each set of hives, in order that they may be restored the year following to the same stock they were taken from.

In autumn such weak hives, as have neither provision nor numbers sufficient to protect themselves the winter, should be joined to richer hives: for the greater number collected together, will be a mutual advantage to each other during the winter, and accelerate their labours very much in the spring. For this purpose, take a weak and a rich hive into a room, a little before night: then force the bees out of both hives into two separate empty hives, in a manner that shall be hereafter directed; shake upon a cloth the bees out of the hive which contains the fewest, search for the queen, and as soon as you have secured her with a sufficient retinue, bring the other hive, which contains the greater number, and place it on the cloth on which the other bees are, with a support under one side, and with a bird's wing sweep the bees under it. They will soon ascend; and while under this impression of fear, will unite peaceably with the other bees: whereas had they been added to the bees of the richer hive, while in possession of their castle, many of the new-comers must have paid with their lives for their intrusion.

I at first supposed that the bees were purchased in common hives: it is now therefore proper to return to the old original hives, which generally contain from two pecks to a bushel.

So soon as the swarm is come out, one of my hives should be put under it; and if the bees soon want room, a second should be added; for as in these large hives, the number of young bees may be great, room should be given them proportioned to their numbers. The two additional hives may become here more necessary, for as the old hive is very large, the queen may be tempted to continue laying eggs longer in it, and a longer time will be necessary to fill it with honey. When well stored with honey it should be taken away, and the honey and wax turned to the proprietor's use. The bees being now left entirely to my hives, are to be afterwards managed as already directed; observing only, that no second or subsequent swarm are to be permitted to quit these hives; let such be restored to them, first securing the young queen, as but one can reign in a hive.

It may not be improper to compare my hives with the old, that we may state an account of the advantages and disadvantages of each.

The object of keeping bees is undoubtedly for the advantage of procuring honey and wax in the greatest

greatest plenty, and with the greatest ease. In these respects, I think the advantage will be found in favour of mine.

The succession of my hives keeps the bees constantly employed; perhaps excites their industry, and encourages the encrease of inhabitants: and as the quantity of honey and wax is in proportion to the number of working bees, the advantage is on my side; nor are they in danger of wanting in the winter, as I have directed a reserve to be made.

The use of a hive is to afford a safe lodgment to the bees, and a conveniency for stowing their provisions. Two of my hives abundantly answer these purposes, and the bees are able to fill two of mine as soon as they can one of the old construction; which is attended with this considerable advantage, as the honey thus procured is more fragrant than honey which remains longer exposed to the perspiratory matter of the bees, and to the heat of the hive; for these rob it not only of its fragrance, but also of its colour, which becomes darker the longer the honey remains in the hive, as is evident from the different colours of new and of old combs.

It is well known to those who are conversant in the care of bees, that their numbers decrease greatly in the autumn, not only by the murder of the
the

44 *On the Management of Bees.*

the drones, but also by the unavoidable deaths of many of the working bees; owing to the many accidents they meet with in the fields, and to age. A much less space is therefore wanted for them in the winter, than was necessary in the summer; and the closer they are collected together in the winter the warmer they will be. Surely this end is more effectually obtained in my hives, one of which is fully sufficient to contain the number of bees that remain at that season, I think I may say better, than a large mansion, of which they fill but a corner. If the upper hive is so full of honey, that it cannot contain them at the beginning of the winter, the lower hive yields abundant room till they have consumed so much honey as to make room in the upper, when the lower may be taken away, which will add to their warmth and consequently preservation.

When a swarm is to be put into one of the boxes, the slide at bottom, or one of the panes of glass in the lower part is to be taken out, and the bees will readily enter, especially if the queen has been put into the box before them: the slider or pane of glass is then returned to its place, when the bees will go to work, passing through the small entrance in the box.

The bees will naturally fill the upper part of the boxes first, and so work downward. When you observe that the boxes are crowded, and that

that the combs in the upper part are well stored with honey, (which you can satisfy yourself of by looking in at one or two of the doors) the cover at top is to be taken off, and one of the frames with the combs in it is to be taken out, the cover is then to be immediately returned. If on first looking into it, many bees appear in and about the combs in the frame, repeated taps may be given the glass next to the frame, and the bees will probably quit it, retiring to other parts of the box; or if but a few are seen on it, the frame may be taken out, and the bees being swept off with a feather, they will return to their companions. The combs are then taken out of the frame, by slipping out the moving slides, and when cleared of the comb, the frame is again returned to its place. The other frame may be taken out at the same time, or it may be delayed for a few days, as your judgment shall direct.

When the combs of the lower part of the boxes are to be taken out, it should be done immediately after the combs are taken out of the upper frames, first giving some gentle taps on the glasses below; on this the bees will ascend, and the slide which enters between the boxes being pushed home, a pane of glass is to be taken out, the combs cut from the bars at top, and as soon as cleared, the pane of glass is again put in. If any bees remain on the comb, they may be brushed off,
and

and the slider being again drawn out, the bees will soon return to their labour.

As the boxes are only secured together by clasps, the upper part may be taken intirely away when full of honey, returning the bees to their fellows, and an empty box may be put in its place.

The reader will perceive that this method of robbing the bees occasionally and so easily, of part of their combs, is preferable to the former practice of taking the whole box at once. If the owner's curiosity prompts him to examine frequently how the bees proceed in their labours, the boxes, fig. 10, afford an easy opportunity; for as there are but three combs in each separate frame, he can at any time discover where the queen is, and how she is employed, as well as see the labours of the working bees: and this with a distinctness and ease, incomparably superior to what can be done in glass-hives.

If the weather is very warm, the bees in these boxes may be subject to considerable inconveniencies, especially if, as Dr. Warder* observes, the appearance of a shower drives the bees home in such crouds, that pressing to get in, they stop the passage so close, that those with-

* Monarchy of Bees, p. 128. † P. 112.

in are almost suffocated for want of air; which makes these last so uneasy, that they are like mad things. In this extremity, he has lifted the whole colony up a little on one side, and by thus giving them air, has soon quieted them. He has known them, he says, come pouring out, on such an occasion, in number sufficient to have filled at once two or three quarts; as if they had been going to swarm.

The Memoirs of the truly laudable Berne Society, for the year 1764, give us a particular instance of this, when they say †, that in 1761, many in Swisserland were obliged to smother their bees, when they saw the honey and wax trickling down; not knowing any other remedy for the losses they daily sustained. Some shaded their hives from the sun, or covered them with cloths wet several times a-day, and watered the ground all around. In this case the top slide of my boxes may be drawn out, or a similar slide may be prepared, perforated with small holes, which will cause a current of air through the box.

Directions for separating Hives and Boxes.

The convenience of having hives and boxes standing one over the other is now so evident, that I shall not proceed further in this particular, but close this chapter with a direction for separating them when the comb descends from one to the other.

Let a piece of wire be well nailed that is heated in the fire, and afterwards suffered to cool gradually as this will render it tough, when thus prepared, let a piece of a proper length have each end well twisted, about two pieces of stick for the convenience of the hand; this wire is to be worked backward and forward by two persons, where the boxes or hives are to be separated, while a third keeps them steady, and so wrought until the wire passes through the comb, when the separation may be made with ease.



The Method of taking the Wax and Honey, without destroying the Bees.

IT appears from the account of the management of bees in my hives, that there is very little art wanting to oblige the bees to quit the hives which are taken away, unless a queen happens by chance to be among them. In that case the same means may be used as are necessary when we would take from the common hives part of their wealth. The method is as follows:

Remove the hive from which you would take the wax and honey into a room, into which admit but little light, that it may appear to the bees, as if it was late in the evening. Then gently invert the hive, placing it between the frames of a chair, or other steady support, and cover it with an empty hive, keeping that side of the empty hive raised a little, which is next the window, to give the bees sufficient light to get up into it. While you hold the empty hive steadily supported on the edge of the full hive, between your side and your left arm, keep striking with the other hand all round the full hive from top to bottom, in the manner of beating a drum, so that the bees may be frightened by the continued noise from all quarters; and they will in consequence mount out of the full hive into the empty one.

K

Repeat

Repeat the strokes rather quick than strong round the hive, till all the bees are got out of it, which generally is in about five minutes. It is to be observed, that the fuller the hive is of bees, the sooner they will have left it. As soon as a number of them have got into the empty hive, it should be raised a little from the full one, that the bees may not continue to run from the one to the other, but rather keep ascending upon one another.

So soon as all the bees are out of the full hive, the hive in which they are collected must be placed on the stand from which the other hive was taken, in order to receive the absent bees as they return from the fields.

If this is done early in the season, the operator should examine the royal cells, in order that such as have young in them may be saved, as well as the combs which have young bees in them, which should on no account be touched, though by sparing them, a good deal of honey is left behind. Then take out the other combs, with a long, broad and pliable knife, such as the apothecaries make use of. The combs should be cut from the sides and crown as clean as possible (to save the future labour of the bees, who must lick up the honey spilt, and remove every remains of wax) and the sides of the hive scraped with when different swarms are to be united; or when honey is to be taken from an over-loaded hive:

a. table

a table-spoon, to clear away what was left by the knife. During the whole of this operation, the hive should be placed inclined to the side from which the combs are taken, that the honey which is spilt may not daub the remaining combs. If some combs were unavoidably taken away, in which there are young bees, such should be restored into the hive, and secured by sticks in the best manner possible. Place the hive then for some time upright, that any remaining honey may drain out. If the combs are built in a direction opposite to the entrance, or at right angles with it, the combs which are the furthest from the entrance are to be preferred; as they are best stored with honey, and have the fewest young bees in them.

Having thus finished taking the wax and honey, the next business is to return the bees to their old hive; and for this purpose place a table covered with a clean cloth, near the stand, and giving the hive in which the bees are a sudden shake, at the same time striking it pretty forcibly, the bees will fall on the cloth. Then immediately put their own hive over them, raised a little on one side, that the bees may the more easily enter, and when all have ascended, place it on the stand as before. If the hive in which the bees are, be turned bottom uppermost, and their own hive placed over it, they will immediately ascend into it, especially if the lower hive is struck on the sides to alarm them.

As the chief object of the bees during the spring and beginning of the summer, is the propagation of their kind; honey during that time is not collected in such quantity as it is afterwards: and on this account it is scarcely worth while to rob a hive before the latter end of June; nor is it safe to do it after the middle of July, lest rainy weather might prevent their making good the combs they have lost, and laying in a stock of honey sufficient for the winter.

When we have reviewed the various means made use of both by the antients and moderns in taking honey, it appears somewhat surprising, that a method so simple as the above did not occur to them: and especially that M. de Reaumur did not think of extending to general use, what he had frequently practised in the course of his experiments. It seems he did not reflect on the effects of fear, impressed on the bees by the continued noise, and how subservient it renders them to our wills: indeed to such a degree, that afford them but a quiet retreat, they will remain there; and become so mild and tractable, that they will bear any handling which does not hurt them, without the least shew of resentment. On these occasions their only desire seems to be to avoid such another dislodgment, they have been just released from. A person who has familiarized himself to bees, can by means of the passion of fear thus impressed upon them, and by a dexterity in the manage-

management of them, do almost what he pleases.

Spectators wonder at my attaching the bees to different parts of my body, and wish much to be possessed of the secret means by which I do it. I have unwarily promised to reveal it; and am therefore under a necessity of performing that promise: but while I declare that their fear, and the queen, are my chief agents in these operations, I must warn my readers, that there is an art in it only to be acquired by practice, in the prosecution of which, the destruction of many hives must be the consequence.

From experience I find, that as soon as I turn up a hive, and give it some taps on the sides and bottom, the queen immediately appears, to know the cause of this alarm: but as soon retires again. Being accustomed to see her so often, I readily distinguish her, and seize her with a tenderness that does not in the least endanger her person. This is of the utmost importance, as the least injury done to her is the destruction of the hive, unless another is immediately put in her place. When possessed of her, I can without injury to her, or exciting that degree of resentment that may tempt her to sting me, slip her into my other hand, and, returning the hive to its place, hold her there, till the bees missing her, are all on wing, and in the utmost confusion. When the bees are thus distressed, I place the queen where-

ver I would have the bees to alight. The moment a few of them discover her, they give notice to those near them, and these to the rest; the knowledge of which soon becomes so general, that in a few minutes they all collect themselves round her; and are so happy in having recovered this sole support of their state, that they will remain a long while quiet in this situation. Nay, the scent of her body is so attractive, that it induces them to pursue any path she has taken.

My attachment to the queen, and my tender regard for her precious life, makes me desirous to close the detail of this operation, which I am afraid, when attempted by unskilful hands, will cost many of their lives; but my love for truth forces me to declare it. I am so much accustomed to this work, that I can, without hurt to her person, tie a thread of silk round her body, and lead her where I please: or I sometimes use the less dangerous practice, of clipping one of her wings.

It may not be improper to mention here, that a pot with live coals, covered with a tin funnel, through which the smell of gabanum, or of dried dung, may be conveyed to the hive, will expel the bees, and, for a time, intoxicate them: As will live coals in an earthen pot, into which the paring of linen has been flung, in order to create a great smoke, and from which they will gradually recover; this contrivance may be of use
when

when the first is practised be careful to separate the queens. The hive, whose inhabitants are to be expelled, must be so fixed over another, that they may fall into it, admitting the smoke through a funnel (as mentioned above) or blown in by a pair of bellows.

The necessity the keepers of bees are frequently under of uniting stocks for their mutual preservation, I shall introduce the method practised by the Rev. Mr. Thorley of Oxon, who was careful in the season to provide himself with what is called in our herbals *fungus maximus*, or *fungus pulverulentus*, or *large mushroom*, commonly known by the name of *burt*, *puckfist*, and *frogcheese*, which grows to the size of one's hand in the open field; this is to be pressed together, then to be tied up in paper, in which it is to be dried in an oven after bread has been taken out; when to be made use of, take to the quantity of an hen's egg, put it in a cleft stick set erect in a hive, turned up and fixed in a bucket or pail; this apparatus when to be made use of, is to be placed near the hive you are to engage with, when the fungus is to be set on fire; over this place the hive, covering the whole with a sheet to prevent the smoke from dispersing; in about a minute the bees will fall like hail into the empty hive; when they drop but slowly, strike the hive with a stick to bring down what may be in it; but after this should any remain, take off the hive and pounce it on a table, when perhaps the queen will fall, as it is not an

easy matter to force her out. Then according to circumstances proceed with your bees, as you have been directed; but when this method is put into use be as expeditious as possible, lest the bees recover from their stupified state, before you have perfected your work.

The straw work which is made for the covering of the hive when it stands the uppermost, is also recommended to be placed under the winter hive, where it is to continue until the season for working is come, now and then removing it to take off any impurities that may from time to time have been collected; and that the bees should not be tempted to go abroad too early in the spring, let the passage of the hive be turned to the west, as then they will be less exposed to the sudden glares of light that are at that season, which but betray them to an immediate death.

In page 36 is given a list of such particular Plants, &c. as are necessary for the support of Bees, but as some further particulars are mentioned by Mr. Worlidge respecting Buck-wheat, in his mystery of husbandry, I shall here give it, viz. "That forty hives containing seventy pound
" weight of honey each, were filled in the space of
" a fortnight, being placed near a field of it in
" Kempen-land in Germany; he also observes
" how advantageous mustard and turnips may be
" made to bees by different sowing, particularly
" of the first, so as to have it in bloom for several weeks, and that when other food is scarce."

Directions

Directions for strengthening a weak Hive, or taking honey from a rich one.

This method was practised in the following manner by a lady in France, who, on perceiving any of her hives in that state, took a wide mouth bottle, which she applied to the entrance of a strong hive, and then with a slender stick struck the hive on the opposite side, so that many of the bees entered immediately into the bottle, in which when she judged there was a sufficient number, she covered the mouth with paper. These were now to be united with the inhabitants of the weak hive, which was thus executed: She directed the hive of weak bees to be taken to a convenient place, where, being placed over a tub of water, she directed it to be pounced on a stick laid across for the purpose, until all the bees were forced into the water, where they remained for the space of a minute, with those in the bottle; they were then released from this, by having the water gently poured on a cloth, strained over an empty vessel, and when thus separated they were laid on brown or whited-brown paper, which soon absorbed such water as remained on them; in this state the queen was sought for, and when secured and she became alert, was returned to her hive, which she soon entered, as did all the bees without any distinction, on being let out of the canvas bag (in which they were put, when they began to shew signs of recovery) at the entrance of the hive.

This method of putting them into water, must be of great security to those who are at any time employed in removing the wax and honey from hives, that the bees have not entirely quitted; this will also preserve the lives of many of them, which otherwise must have been killed; the best manner of putting these bees into the water, will be with a bird's wing; bees besmear-
ed with honey by the breaking of the comb, may be also preserved by washing them in water.

As it is necessary frequently to feed bees for their preservation, the two following methods are recommended: In September, if you discover your hive to have a quantity of empty comb in it, cut it out, replacing it with that which is filled with honey, which must be secured with sticks, to prevent its falling down when the hive is placed on the stand: The other method is to pour liquid honey into a plate, laying over it some straws across, and these to be covered with paper pierced into holes, to prevent the bees besmearing themselves, as is more particularly directed in the chap. on feeding bees, &c. page 62.

At some seasons the honey will have contracted a congealed state, when it must be removed, as being no longer of use to the bees, and in removing of which, if not assisted, they so besmear themselves, that they become immoveable from the spot they alight on.

*Of separating the Honey and Wax.*

IN order to separate the honey from the wax, the combs should be laid in a place perfectly secure from the access of bees; for otherwise they would not only carry off much honey, but also be extremely troublesome, by stinging the people at work. It is proper to burn cow-dung or rotten hay at the doors and windows of this place; as the smoak arising from it will be so disagreeable to the bees, that it will drive them away. If the combs are taken out of the hives before the end of autumn, there are generally some young bees in them; this part of the combs should be laid by, as they would give an indifferent taste to the honey. The bee-bread should also be separated, both of which is directed to be melted with the wax.

Before the combs are laid to drain, they should be carefully cleared of every sort of filth, or insects. The crust which the bees cover the honey should be pared off with a sharp thin broad knife, and the combs so divided through the middle, as to render the cells open at both ends, when the honey will more freely flow from them. The combs in this state should be laid on sieves; for
this

this purpose, that which runs quite clear should be kept by itself, as being the best.

The combs which are but partly filled, and those that are set to drain, are broken by hand, to assist the honey running off. Some put the broken combs into a strong bag, and press them; not considering that much of the wax passes through the bag with the honey, which should be carefully separated, as it may with ease when the honey is grown hard. This honey should not be mixed with the first running, as being less pure.

The makers of mead need not be at this trouble, for by washing the wax in cold water, the honey will dissolve in it, when the wax may be separated, by running the water through a coarse cloth; this water may be used in making mead. The wax that has been skimmed off the honey separated by pressure, should be washed in the same manner, that no part of the honey may be lost.

The goodness and flavour of honey depends on the fragrance of the plants from which the bees collect it: hence it is that the honey of different places is held in different degrees of estimation. That which is made early in the year is also preferred to that is collected in the latter end of the season. The colour of the honey is also affected by the juices collected by the bees. The honey collected from trees is higher coloured than
that

that from flowers, as is that from heath deeper than any collected from blossoms or flower.

In order to obtain the wax in a pure state, what remains of the combs after separating the honey, together with the combs which contain the bee-bread, and young bees or maggots, they are put into a copper with a sufficient quantity of clean water, which is to be boiled over a slow fire, and frequently stirred with a stick. When the wax is melted, it is to be run through bags, which are put into a press, in order to separate the wax more perfectly. The wax is to run from the press into a vessel placed underneath, with some water in it, to prevent this wax from sticking to it. What remains after the pressure may be again boiled in water, in order to extract whatever wax may remain: and this to be repeated by slow boilings, rather than by boiling it strongly at once.

In order to refine the wax, and to add to its purity, let such as has been collected by the former process be put into a vessel with some water, to be again melted. The pure wax should then be taken off and poured into a vessel, which shall give its form, observing to wet the sides of the vessel with water, leaving a litter at the bottom, which will make the wax come out readily from the mould, where it is to remain until cold. It has been observed that, the larger the cakes of wax are, the better they keep, and for these the highest price is given. As soon as the pure wax
has

has been taken off, let the rest remain in the water it was boiled in until cold, when it may be easily collected, and when re-melted, may be added to the wax first taken off, as its impurities will have fallen to the bottom. The chief thing to be attended to in this process is to have the wax gradually melted, as by this method it retains its softness, by which it will more readily yield to the action of the sun in bleaching.

C H A P. VII.

Of feeding Bees, and of the care of them during the Winter.

PROVIDENCE has ordained that insects which feed on leaves, flowers, and green succulent plants, should remain in an insensible or torpid state during the season they are deprived of this means of subsistence. Thus the bees, during the winter, are in so lethargic a state, that little food supports them: but as the weather is very changeable, and every warm or sunny day revives them, and prompts them to return to exercise; food becomes necessary on these occasions. Mr. White is of opinion*, that a greater degree of cold than is commonly imagined

* P. 9.

to be proper for bees, is favourable to them in winter. If a sharp † frost continues for two or three months, without intermission, you may observe through your glass, that the bees are all this time closely linked together in clusters between the combs. If they are not altogether without motion, yet it is certain they stir not from their places, while the cold continues, and therefore eat not at all.

The following directions are given for feeding of bees in the *maison rustique* †. Replenish the weak hives in September, with such combs as were taken from other hives in the beginning of the season. In order to do this, turn up the weak hive, first taking the precaution directed when the bees are to be fumigated, as in page 55, &c. or that practised by a Lady in France: when you are to cut out the empty combs in the hive they are to remain, and put full ones in their place, which are to be secured with slender sticks run a-cross, in such manner that they may not fall down when the hive is returned to its place, which will be sufficient, as the bees will soon fix them more effectually; but should this be thought too troublesome, set under the hive a plate of liquid honey, unmixed with water, with straws laid across, and over it a paper pierced full of holes, through which the bees will suck the

† P. 10. † Tom. i. part i. liv. v. c. 1. p. 435.

honey without besmearing themselves. This care of the bees should be taken in cloudy or rainy weather, when the bees stir least abroad, covering the hive to protect them from robbers, who might be allured by the smell of the honey.

Another circumstance which may render it very necessary to feed the bees, is, when several days of bad weather ensue immediately after they have swarmed; as they are then destitute of every supply beyond what they carried with them, which renders this attention very necessary, and must continue during the unfavourable weather.

The degree of cold which bees can endure has not been yet ascertained. We find that they live in the cold parts of Russia, and often in hollow trees, without any care being taken of them; their hives are frequently made of the bark of trees, which does not afford them much protection from cold. Mr. White * therefore judiciously confirms Mr. Geddes's observation, that bees which stand on the north side of a building whose height intercepts the sun's beams all the winter, will require less provisions (almost by one half) than those which stand in the sun: for coming seldom abroad, they eat little, yet, in the spring, they are as forward to work and swarm, as those which had made use of twice as much honey in the preceding autumn. The owner

* P. 11.

should, however, examine their state in the winter, and if he finds that, instead of being in clusters between the combs, they fall down in numbers on the stool or bottom of the hive, they should be taken to a warmer place, where they will soon recover, using great caution in returning them again to the cold, lest the honey should candy, as in this state it will become useless, and must be immediately removed.

Where the winters are extremely severe, the authors of the *Maison rustique* advise †, to lay on the bottom of an old cask the depth of half a foot of very dry earth pressed down, and on this set the stand with the hive; and preserve a communication with the air, which is necessary; to cut a hole in the cask, opposite to the mouth of the hive, and place a piece of reed, or of elder made hollow, from the mouth of the hive to the hole in the cask; and when this is done to cover the hive with more of the same dry earth. If there be any reason to fear that the bees will not have a sufficiency of food, a plate with honey, covered as before directed in page 58, should be first put under the hive. If the number of hives are many, boxes may be made of deals of sufficient depth to receive the hives when covered with dry earth; in this state the bees may be preserved all the winter free of any danger from cold, hunger, or their enemies.

† Tom. i. part 1. liv. v. c. 1. p. 441.

Every hive should have at least twenty pounds of honey in it in the beginning of the winter. If short of that quantity, a reserved hive should be put to them, or they should be fed with clean honey, put into a dish, as has been directed, put under the hive at night. For feeding bees in boxes, three or four pounds of honey should be put into the vessel, fig. 13, already described. A piece of paper of the exact dimensions of the cavity in the vessel where the bees are to feed, pierced with holes, is to be laid on the surface of the honey; and in the evening the entrance into this box being closely applied either to an opening made in the back of the lower part of the bee-boxes, and securely supported in that situation, or to the mouth of the bee-boxes, the bees will soon smell the honey, and carry it all off by morning. By this means, robbers are not tempted, indeed have no opportunity of annoying them, as the vessel is removed in the morning. If the first quantity is not deemed sufficient, this must be repeated the next night.

That bees survive very high degrees of cold, is certain, nor are we less so, that our more mild climate is not so favourable to them; yet if I may venture my opinion, that in the frozen climes their juices do not corrupt, but remain in a pure state until the return of spring; when the change of the weather being sudden, the bees
come

come soon to life: whereas in our climate they are so far chilled, as to lose all signs of life, yet their juices being in a liquid state, soon putrify, when real death ensues with corruption, the stench of which proves destructive to the hive, if the dead bodies are not soon removed; therefore it will be necessary to examine the state of the hive from time to time, and to remove such as fall down and have the appearance of being dead.

Hives should never be placed on stones, as they are susceptible of too much heat in the summer, and so cold in the winter that it is immediate death to any bee that alights on them. Even wood is then too cold; and therefore I would advise the owners of bees to have straw bottoms, in every respect similar to the straw covers already described, to be laid under the hive during winter, that when the bees descend, they may not be chilled by the coldness of the substance they alight on.

So soon as the weather becomes mild in the spring, the straw bottom should be taken out and cleaned, and put under the hive again, to remain there until the danger of the frost is over. The hives should then be carefully cleaned again, and the quantity of honey examined into; for if the weather comes in so warm as to tempt the bees out, a greater quantity is necessary, as at this season

68 *On the Management of Bees.*

son plants do not yield that juice which constitutes honey; especially if the weather is dry and windy. In April, their young brood occasions an additional consumption of honey; therefore a supply becomes peculiarly necessary, and should by no means be withheld; this neglect frequently occasions the loss of many hives, even so late as the month of May: the addition of one of my hives, which was removed in autumn, would give a most seasonable supply at this season, and the quantity of comb in it made for them will forward their summer's labour.

Every hive should have a thick covering of straw, in form as represented in the plate, to throw off the rain as well as keep the bees warm. Some advise a grating before the doors of the hives during the winter, which would prevent the bees going out to their destruction, and admit sufficient air. I am of opinion that this is wrong, for as it is necessary they should eat a little, it is no less necessary they should go out at times to discharge their excrements, and they have sufficient sagacity to judge of the degree of cold they can bear, and when too great, they drop their excrements on the stool, and return to their companions, unless allured abroad by a bright sun; to prevent this during the winter, the door of the hive should not face the sun at noon, but rather the west, and the entrance at this season so lessened by means of a slide fitted in it, that no
more

more room should be given than a passage for two or three bees to enter a breast.

Even in spring many bees lose their lives by being tempted out by the brightness of the sun, in search of food. The mouth of the hive should therefore be continued facing the west, as has been recommended, till all danger from the cold is past: for should it face the south, a clear morning may invite them out, being tempted by the glare of light that is admitted; but such a morning is often attended with cloudy afternoons, which will prevent their leaving the hive. When the season for working is come, they must not be restrained from going out, as they then become impatient of confinement, which rather than submit to they will die in search of liberty.

C H A P. VIII.

Directions for making Mead.

ALL the writers who have hitherto mentioned this subject, have given into a capital error with regard to the strength of this liquor, by directing too great a proportion of honey to be dissolved in water. The usual practice of making it so strong as to bear an egg, is very wrong. The liquor is thereby rendered a mere
flum,

scum, and this bad quality is still increased by the long boiling generally given it. Three pounds of pure honey to one gallon of soft water, will be found sufficient; but as it is scarcely possible to procure honey so pure but that some bee-bread, wax, or other substance will be mixed with it, has rendered boiling indisputably necessary, in order to separate these from it. I would advise some whites of eggs to be mixed in it before it is put on the fire; but very particular care should be taken to remove the scum that rises upon it, the moment before it begins to boil, and this to be carefully continued so long as it boils. The only intention of boiling being to separate the impurities, and to make a perfect union of the water and honey, both which purposes are so soon obtained, that the boiling need not be continued but a very short time. This circumstance should be particularly attended to in making of mead; for the longer the boiling is continued, the less will the liquor be disposed to ferment; perhaps it is owing to this kind of imprudent management, that has lowered the estimation that mead was formerly held in. The long boiling as is commonly practised, prevents that fermentation which is necessary to remove its luscious sweetness; whereas, were it to undergo a due process, the disagreeable sweetness would go off, and the liquor acquire a pleasing flavour.

Some,

Some, in order to remove the sweetness complained of, have added hops to their mead. This at first gives it a bitterness, which in time goes off. As a fermentation is here wanted, as in all vinous liquors that are boiled, great care should be taken to bring on a perfect one: but as the least taint in the ferment will communicate itself to the whole liquor, a particular care should be taken that it is sweet and good. Mead, managed on these principles, will keep for years, and be improved by age, and when fine may be racked for use.

C H A P. IX.

Directions for destroying Wasps and Hornets, whether in the Garden or in their Habitations.

MONSIEUR de Reaumur, in his account of Wasps observes, that of the great number that compose a colony in the summer, but few survive the winter, and that such as do, are of the female species, one of which is sufficient to people a whole colony, being wonderfully prolifick; so that one of them taken in the spring, is a most valuable acquisition, being equal to the destruction of an entire brood. These females make their appearance in March or April, and as flies, their usual food, is then scarce, they may with the greater ease be taken in traps laid for them; for this purpose he recommends honey, mixed with some fermented

72 *Directions for destroying Wasps, &c.*

fermented liquor, such as wine, cyder, or ale, with which half filled phials are to be hung, on such trees as are in blossom ; this, as he observes, is an attention well worth pursuing, as it may be the preservation of our best fruits, in the season of gathering them. When they have eluded this care and propagated their species, and you have discovered their habitation, which is usually in the side of an ascent, under the shelter of trees, where he recommends their destruction by gunpowder, prepared as for squibs (reduced to powder) with a large portion of sulphur added to it, this to be a little damped, in order to increase the smoke in burning, then to be rammed into some tube, or hollow piece of stuff, with which you may be easily furnished, from the elder tree, or the hemlock-plant, this is to be introduced into the cell, keeping a communication with it, so as to give it fire, which may be done, by a piece of untwisted cord well rubbed into powdered gunpowder : some pieces of linen dipped in melted sulphur, and set on fire, and then with a fork forced into their cells, would contribute to their execution ; this to be performed on a stormy or rainy day (as at such times they do not leave their nests) and a little before night, or very early in the morning, preventing as much as possible the smoke's evaporating ; when this has taken effect, let their habitation be dug up, and thrown into water, or set on fire, for the greater certainty of their destruction.

The

Directions for destroying Wasps, &c. 73

The Hornet another species of these destroyers, who usually have their nests in the eves or roofs of houses, and which are suspended by a narrow neck, the following easy method is recommended for removing them, without danger in the execution; let a person be raised on a ladder, taking with him a bag of a convenient size, in which he must inclose the nest, and when raised so high as to take in the narrow passage, the bag with both hands must be closed on it, and, the whole carried away, keeping all tight, which with the bag, must be immersed in water, and executed in the same sort of weather, &c. as has been recommended in the destruction of the Wasps. If the undertakers of this necessary work are but armed as directed in page 30, they will go about their business with more alacrity, and consequently execute it with more certainty, observing not to make any noise, until you have first secured the passage into the nest.

L

In



In page 36, we have mentioned the Spanish broom, amongst the collection of shrubs, necessary for the feeding of bees; but the following article is so much in favour of the shrub just mentioned, that we cannot omit it.

THE two sorts of broom, which grow freely in England, are the common sort of the fields, and the Spanish broom, which, till very lately, has been propagated only in gardens; but, some gentlemen have raised it in their fields, who before never had any profit from bees, are now masters of weighty stocks; and also begin to find the great use of these plants for binding and working into baskets, for they produce long and tough withs, not to be so soon worn or broken as the withs of willows or osiers. The bloom or flower of this sort is also very beautiful and sweet, perfuming the air like orange flowers, which invite the bees, and regale them so luxuriantly, that their hives are well filled before the working season is over. And, considering the profit of honey and wax, when bees prosper, I think that, whatever ground happens to be planted with such flowering plants, as afford them plenty of wax and honey, may be said to be valuable.

The blossoms of the Spanish broom appear in July, and in cool seasons continue until September. And, when a stock of bees have flowers to their liking, of which this is one of the chief, they

they will fill their hives, both with wax and honey, in five or six weeks time, if the weather will permit them to go abroad: But this hazard is no more than other crops are subject to, the weather having the government of all crops, either for their well or ill fate. The common broom is no way comparable to the Spanish, either for its flowers, or its withs.

These plants, which are not less profitable than ornamental, are easily propagated by seed, which should be sown in spring upon a bed of common earth, in a shady situation, where the plants will rise very freely; to be kept clear of weeds the following summer, and in autumn they may be taken up and transplanted into a nursery, which should be in a warm situation. The plants are to be raised with a spade, that the roots which strike very deep may not be injured; they are to be planted in rows three feet asunder, and at one foot each row, where they are to remain *one* or *two* years, but not more, as they do not succeed if removed when of a greater growth; I would recommend their being planted in hedge-rows, where they would answer the double purpose of a fence, and food for your bees, who are most bountiful and generous in their returns for whatever attention is given them; a remarkable instance of which has accidentally come to the knowledge of the publisher of this edition, related by a gentleman of undoubted veracity. When in the spring some years since, he had two stocks, from which

two he had not less than eleven, which gave him honey; this increase he attributed to the great abundance of food they were furnished with, from a field of white clover, which was but at a small distance from them. This instance of advantage from plenty and nearness of food, should lead us to adopt the method practised in France, of following the pasture. *John's-wort*, though not in the class of odoriferous plants, should be placed among those, selected by the bees, as their favourites.

An approved Direction for making Mead.

THE proportion of Water and Honey is three to one, that is, three quarts of Water to one of Honey; when your quantity of Water is in your vessel, observe to what height it rises, which you are to mark on the side of the vessel, or on an upright stick; when the water comes to a boil, put in your honey, the whole is then to boil untill it comes down to the mark, observing to keep it well scummed during the process; then you are to put in three ounces of hops, to have two or three boils; the whole is then to be run through a hair sieve into a tub or vessel, and when cooler than ale wort, put your barm to it, in the proportion of one pint to half a barrel; the three ounces of hops will be sufficient for that quantity; the whole is to ferment for twenty-four

Directions for rearing Turkies. 77

ty-four hours, when it is to be tuned, observing not to stop it close, until it has done working.

N. B. Be careful that your barm is very good, and free from any ill flavour, as in the fermentation, it will communicate it to the liquor, which perhaps you will not afterwards be able to remove; no less care is to be taken of the vessel, that it is properly sweetened.

Directions for rearing of Turkies.

LET the chick be plunged into cold water, the very hour, if possible, at least the day, it is hatched, forcing it to swallow one whole pepper-corn, when it may be returned to the hen. From that time it will become hardy, and be no more affected with cold than the chicks of the common poultry. The chicks of Turkies are subject to a particular disorder when young, which frequently carries them off in a few days, so that as soon as they begin to droop, examine the feathers on their rump, where you will find two or more, whose quill parts are filled with blood, these are to be plucked out, when the recovery of the chick will be immediate, and afterwards it will require no more attendance than the common fowl.

78 *Directions for Turnips and Cabbage.*

*Directions for preserving the seedling leaves of
Turnips and Cabbages, &c.*

MIX one ounce of the flower of brim stone, with three pounds of turnip-seed daily, for three days successively, in an earthen glazed pot, to be kept close covered, stirring it well each addition, for the better impregnating the seed with the sulphur, when it may be sown, and let the weather happen as it may, the seedlings will be preserved to the third or fourth leaf, when it will be out of danger of the fly, having contracted its natural bitterness.

INDEX.





I N D E X.

A.

AIR, how to be applied, to prevent *immature swarms*, 27
— *bees from suffocation*, 47.

Aspect, the best, for bees in the spring, 10, 56.

— In *winter*, 64, 68.

Autumn, directions for the management of bees at that season, 41.

B.

Bartlet, Mr. his directions, for extracting the *venom of bees and wasps*, 31.

Bees, anatomical description of, the different species, 1—form of the *queen*, 5.

— How propagated, 9, 16.

— Attention to be paid them in the month of *May*, 17.

— The *venom* of their *sting*, different methods of extracting, 30.

— Directions in what

manner they are to be moved for *pasture*, as practised in *France*, &c. 32.

— How to be managed in *bives*, in the *working season*, 38, 42.

— In *weak bives*, how to be managed, 41.

— In *boxes*, the management of them, 44.

— How to force them out of one *hive* into another, for the removal of their *boney*, &c. as practised by *madam Vicat*, 57.

— Directions for restoring them to their *bives*, after depriving them of part of their *boney*, 51.

— How to render them *tractable*, 52.

— their ability to recover from an apparent *drowned state*, 57.

— how to *fumigate* them, in order to force them out of their *hives*, 54.— as practised

I N D E X.

- practised by Mr *Tbor-*
ley, 55.
 - directions for *feed-*
ing them in the *winter*, 62.
 - to be carefully *at-*
tended after *swarm-*
ing, particularly when
rainy or blowing
weather succeeds, 64.
 - their danger from the
sudden *transition* of
weather, to extreme
cold, 66.
 - Bottle*, a *wide mouth one*,
the use that has been
made of it, for *re-*
moving bees, 57.
 - Boxes* for keeping of
bees, directions for
making them, 12.
 - the wood fittest for
them, 15
 - directions for the
management of bees
in them, 44.
 - for *removing* the
honey and *wax* from
them, without *injur-*
ing the bees, 45.
 - directions for *sepa-*
rating the *comb*, when
it has descended from
one to another, 48.
 - for *furnishing* them
with *honey*, 66.
 - Broom*, the *Spanish*, its
use in feeding bees,
— 36, 74.
 - how to be *propa-*
gated, 75.
 - Buck-wheat*, its value,
for feeding bees, *late*
in the *season*, 36.
 - other valuable *pro-*
perties of it, as *men-*
tioned by Mr. *Wor-*
lidge, 56.
- C
- Carriages*, different *con-*
structions of, for the
removal of bees, to
different pastures, 35.
 - Cement* for the use of
hives, 11.
 - Clover*, its value for
feeding bees, 36, 76.
 - Combs* of bees, a *de-*
scription of them, 7.
 - how to be separated
for the *discharging* of
their *honey*, 59.
 - their use when *emp-*
ty, to forward the
work of bees in *future*
seasons, 68.
 - directions for *feeding*
them in hives, when
food is wanting, 63.
 - Congeaed honey*, its
prejudice to bees, 58.
 - Covering*, directions for
making one, to *pre-*
vent any *injury* from
bees, 30.
 - Covers* for hives, their
use and form, 11.
 - those necessary
when

I N D E X.

- when the bees are moved for *pasture*, 34.
- Cow's-dung, its great property as a *cement*, for the use of hives, 11.
- D
- Drone or *male-bee*, a description of, 4.
- F
- Fear*, its remarkable influence on bees, 52.
- Feeding of bees, directions for making a vessel for, 15.
- different methods of performing, 58, 62, 66.
- Frost, the advantage of it to bees, 63.
- the advantage of, accounted for, 67.
- Fungus Maximus*, its use for *fumigating* bees, 55.
- G.
- Gabanum*, its use in *fumigating* bees, 54.
- H.
- Heath*, its value for lengthening the *season*, of feeding bees, 36.
- Hives, those best fitted, for the purpose of feeding bees, 9.
- their situation in *spring*, 10.—in *winter*, 64, 68.
- directions for making, 10.
- a view of one, 12.
- how to be preserved, from *vermin* and *wet*, 12.
- directions for preparing them, for the *hiving* of bees, 25.
- — for *weighing* them, as recommended by the *Dublin Society*, 36.
- management of the bees in them, during the *working* season, 38, 42.
- when *weak*, how to be *strengthened*, 41.
- directions for *separating* the *combs* in them, when they have descended from one to another, 48.
- — for *taking* the *honey* from them, without *prejudicing* the bees, 49, 54.—As practised by *madam Vicat*, 57.
- how to be *replenished* in the *winter*, 62, 66.
- — to preserve them, in very *severe winters*, 65.
- the *door* of, how to be managed, 68.
- Hiving of bees, how to be performed, 25.
- Honey-dew*, its nature and

I N D E X.

and use for feeding bees, 36.
 Honey, directions for *taking* it from bees, without injuring them, 49—the *time* most proper for doing it, 52.—Mr. *Thorley's* method, 55.—that practised by madam *Vicat*, 57.—when in a *congealed state*, its prejudice to bees, 58.—directions for *separating* it, from the wax, 59.—on what its *colour* depends, 60.

L.

Linen-shreds, their use in *fumigating* bees, 54.

M.

Marjoram the sweet, its value for *feeding* bees, 36.

Mead, makers of, how to use the wax for the purpose, 60.

Mead, directions for making, 69—what is to be observed in regard to the *boiling*, 70—*fermentation* how necessary and to be preserved from *taint*, *ib.* An approved recipe for making it, 76.

Mild winter weather, how prejudicial to bees, 66.

Mustard, its use in *feeding* bees, and how advantageously it may be used, by different sowings, 36.

N.

Net work, the sort of, recommended, for a covering against the danger, to be apprehended, from bees, 30.

Noise, its effect on bees, 21.

O.

Oil of olives, its value in *extracting* the venom of bees and wasps, 30.

P.

Plants, &c. that are most esteemed, for furnishing food for bees, 36, 74, 76.

Proutaut, Monsieur, his method, of moving his *bives* for pasture, 32.

Q.

Queen or female bee, a description of her, 5.—what is necessary to be done, when two come forth in a swarm, 23.—when she

I N D E X.

- the falls in flight, 24.
 — how to be *separated*
 from the *bive*, 23,
 28, 53.
 R.
 Rosemary, its value for
feeding bees, 36.
 Rocque, Mr. his remedy
 against the *sting* of a
Wasp, 31.
 S.
 Savory, its value, for
feeding bees, 36.
 Seasons when bees more
 particularly are to
 have *food* given
 them, 58, 62, 64, 68.
 Second *swarms* and *sub-*
sequents, of little va-
 lue, 26.
 — their use in *strength-*
ening bives, 41.
 Situations, best for
bives, 10, 56. — in
winter, 64, 68.
 Soot, its use, in preserv-
 ing bees, from *ver-*
min, 12.
 Spanish broom, its use
 for *feeding bees*, 36,
 strongly recommend-
 ed for hedge-rows, 74.
 — how to be propagated,
 75.
 Stands for bee hives
 directions for making
 them, 11.
 Sting of bees or wasps,
 directions for extract-
 ing the *venom* of, 30.
 Stone-stands, very pre-
 judicial to bees, 67.
 Straw bottoms, their
 use in *winter*, 67.
 Straw, its use in *cover-*
ing bives, 68.
 Sulphur, its use in pre-
 paring turnip seed, so
 as not to be injured
 by the fly, 78.
 Swarms of bees, how
 to be attended, 16.
 — time of the day they
 mostly come forth 17.
 — different signs to be
 observed, preceding
 their coming forth,
 18.
 — — of an after one, 19.
 — times most *favoura-*
ble for bees *swarm-*
ing, 20.
 — directions for collect-
 ing them, when *high*
 on the *wing*, 21.
 — form of one collect-
 ed, 22.
 — when divided into
 two divisions, 23.
 — when two queens
 come forth, how to
 be managed, 23.
 — directions for *biving*,
 24.
 — — to prevent their
 coming off too fre-
 quently, 26.
 — for

I N D E X.

- for bringing them forward, 27.
- for encreasing weak ones, 29, 57.
- the weight they should be of, for standing the winter, 29.
- directions for uniting them, 41. as practised by a lady in France, 27.
- — for managing one, when come out, 42.
- T.
- Thyme, its value for feeding bees, 36.
- Turnips, in bloom their use in feeding bees, 36, 56. — how to be prepared with sulphur so as to preserve them from the fly, 78.
- W.
- Wax, directions for separating, it from honey, 59.
- in what state it keeps best, 61.
- directions for taking it off pure, when in a fluid state, 61.
- for refining it, ib.
- for keeping it in a soft state, for the advantage of bleaching, 62.
- Water, how used, in the management of bees, 27.
- Weather, when very cold, how to preserve your swarms, 65.
- Weight necessary for a swarm to be esteemed a good one, 29.
- of a hive in order to support itself, in the winter, 66.
- Willman, Mr. his method of collecting bees, about him, 53.
- Winter, at the approach of, directions for the management of hives, 40.
- the best situation for bees, 64, 68.
- Wire, directions for preparing it, for the purpose of separating the combs, whether in hives or boxes, when they descend into one another, 48.
- Worlidge, Mr. his account of the extraordinary advantages of buck-wheat, as a food for bees, 56.
- his observations on the management of sowing mustard seed, for the food of bees, ib.

F I N I S.

